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NEW SPECIES OF *DINOGAMASUS* (*DOLAEA*), SYMBIOTIC MITES OF CARPENTER BEES FROM THE ORIENTAL TROPICS

By NORMA LEVEQUE[1]

Mites of genus *Dinogamasus* Kramer (*Dolaea* Oudemans) of the Oriental tropics appear to fall into a few rather distinct groups which correspond with the grouping of species of their hosts (or symbionts) of genus *Mesotrichia* (*Koptorthosoma*), carpenter bees.

In Novitates, No. 432, October 9, 1930,[2] I reported on two new species, *Dinogamasus philippinensis* and *D. piperi* from the Oriental tropics, which belong to the *perkinsi* group. These two species, as well as *perkinsi*, were taken from the abdominal pouch of mesotrichian bees of the *latipes-tenuiscapa* group, considered by Westwood to be carpenter bees of subgeneric rank, *Platynopoda*. The African species which I reported in Novitates, No. 434, October 14, 1930,[3] likewise fell into a few groups closely correlating with host relationships. In the present article it will be seen that there are other groups of mites correlating with the apparent subgeneric groups of carpenter bees with which these mites are so closely associated.

Holotypes are deposited in The American Museum of Natural History, New York City, and a set of paratypes will be at the National Museum, Washington, D. C. All figures have been drawn with the camera lucida but are not necessarily all of the same scale. The drawing of the mandible in all cases is of larger magnification.

Dinogamasus kerrianus, new species

FEMALE.—Length: 1600μ–1900μ. Width: 960 μ–1100μ. Approximate length of legs: I, 1100μ; II, 1000μ; III, 1240μ; IV, 1500μ.

Dorsal shield leaves a narrow margin of soft skin from the third legs to posterior part of the body; just behind legs IV many specimens show a slight notch in the shield. Very fine, extremely short hairs are scattered over the shield and on the soft skin; they are somewhat more frequent in the shoulder region; two pairs of longer hairs are at the end of the shield.

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[2]'Two new species of *Dinogamasus*, mites found on carpenter bees of the Oriental tropics.'

[3]'Mites of the genus *Dinogamasus* (*Dolaea*) found in the abdominal pouch of African bees known as *Mesotrichia* or *Koptorthosoma* (Xylocopidæ).'

Sternal shield, slightly rounding at posterior end, is 240μ wide and 200μ long. There are extra hairs on the shield besides the two pairs of sternal hairs. There is a tendency for the third sternal hairs and the metasternal hairs to be doubled. Stigmal plate large, measuring 200μ by 120μ. A peritrematalium is evident but due to poor chitinization it is impossible to describe it with accuracy. Genital shield 480μ long, sides almost parallel, but broadly rounding at posterior end, 180μ at greatest width. Anal shield 320μ by 220μ, 150μ at posterior end. Ventral surface of body around anal shield is almost bare except for approximately twelve hairs between anal shield and genital shield. Fixed digit of mandible as long as movable digit.

Coxal spines slightly inflated, sharply pointed, and all about same size. Hairs and cones on legs not especially strong. On patella I and tibia I there are three basal blunt cones; on tarsus I there are two basal and one midway blunt cone. Tarsus II has one blunt cone on basitarsus, a short round cone ventral, and a larger heavier cone outward and subapical.

HABITAT.—Abdominal pouch of *Mesotrichia kerri* Cockerell, from Doi Sutep (Chiengmai Mt.) Siam, collected by McKean; and from Ranawng, Siam, collected by Kerr.

Holotype, from Ranawng, Siam, measures 1700μ long, 960μ wide.

This species is similar to *Dinogamasus sternisetosus* (*Dolaea sternisetosa* Vitzthum), 1930, except for smaller size. (The measurements of *sternisetosus* are: length, 2120μ; width, 1700μ. Legs: I, 1240μ; II, 1140μ; III, 1535μ; IV, 1820μ.) Several specimens of *kerrianus* show an in-cupping of the dorsal shield in the region of the noticeable notch characteristic of members of the *perkinsi* group. Vitzthum says that this is not so with *D. sternisetosus* ("mit glatten, nicht 'benagten' Seitenlinien"). It is interesting to note that Ritsema in describing *Mesotrichia splendidipennis*, which is the host of *D. sternisetosus*, and that Cockerell in describing *M. kerri*, the host of *D. kerrianus*, made comparison of the bee with *M. tenuiscapa* of subgenus *Platynopoda*, the host-group of the *perkinsi* group of mites. Perhaps if other related species are found it will be seen that *sternisetosus* and *kerrianus* grade into the *perkinsi* group.

THE *Alfkeni* GROUP

Small to medium-sized mites; 1200μ to 1700μ long; central area of dorsal shield sparingly covered with a few pairs of hairs more or less symmetrically placed along the median line; sternal shield, wider than long, bearing two pairs of sternal hairs, the second pair near the posterior corners of the shield; metasternal hairs sometimes lacking; anal shield widest through anal opening which is usually two-thirds distant from posterior end of shield; peritrematalium usually discernible, slightly broadened at distal end; mandibles with fixed digit almost as long as movable digit; leg I with three basal and one midway-outer blunt cone on patella and tibia, with two basal and one midway-outer blunt cone on tarsus; leg II with one midway-outer blunt cone and two sharp ventral spines in a cross-row on patella and tibia, and with the three following structures on tarsus: one blunt cone on basitarsus, one blunt cone

midway-ventral on apical segment, and a heavily chitinized clawed cone outward close to apex of segment.

GEOGRAPHIC RANGE.—India, Singapore, Siam, Philippine Islands.

HOSTS.—Asiatic *Koptorthosoma: Mesotrichia confusa, M. viridissima, M. bombiformis, M. philippinensis, M. ghilianii, M. trifasciata, M. chlorina, M. blüthgeni, M. cuernosensis.*

KEY TO SEPARATE NEW SPECIES OF *Dinogamasus* BELONGING TO *alfkeni* GROUP

1.—Metasternal hairs present, flanking anterior end of genital shield.....2.
Metasternal hairs absent.....3.
2.—Short hairs on body (about 40μ long on dorsal shield).....*macgregori.*
Long hairs on body (160μ or longer on dorsal shield).....*trihirtus.*
3.—Legs IV not as long as length of body.....4.
Legs IV about as long as body.....*longipes.*
4.—Length of body less than 1.5 mm.....5.
Length of body more than 1.5 mm.....*ramaleyi.*
5.—Dorsal shield broad, almost covering posterior end of body, long hairs more frequent on posterior lateral sides of body.....*concinnus.*
Dorsal shield more tapering at end, hairs quite evenly distributed around margin of body.....6.
6.—Slightly smaller forms (measuring not over 800μ wide and not over 1360μ long). *alfkeni.*
Slightly larger forms (measuring from 800μ to 900μ wide and about 1460μ long). *similis.*

Dinogamasus alfkeni (Oudemans)

Greenia alfkeni OUDEMANS, 1902, Tijdschr. Entom., XLV, pp. 126–128.
Greeniella Alfkeni VITZTHUM, 1912, Zeitschr. wiss. Insektenbiol., (2) VIII, p. 94.
Dolaea alfkeni VITZTHUM, 1920, Arch. für Naturg., LXXXV (1919), Abt. A, Heft 5, pp. 8–10.
Dolaea alfkeni VITZTHUM, 1930, Zoolog. Jahrb., LIX, pp. 343–345.

This species has been variously described and figured. Dr. Oudemans very kindly sent me several specimens labeled "from *Koptorthosoma æstuans* (L.), Singapore, October, 1900, J. D. Alfken" (without doubt it is really *Mesotrichia confusa*), from which I made comparisons with specimens from *M. confusa* (Pérez) which has been so frequently confused with *æstuans*. It may be noted also that Vitzthum has well figured and redescribed *D. alfkeni* in the 1930 publication. He records *alfkeni* from *M. confusa* from Sumatra and Java, and from *M. coronata* (Smith) from "Tenimber-Inseln (Molukken)."

I have *D. alfkeni* from *M. confusa* from Singapore and also from Sikkim, India (from the Bingham collection, Berlin Museum; the latter specimen may not have the correct locality label).

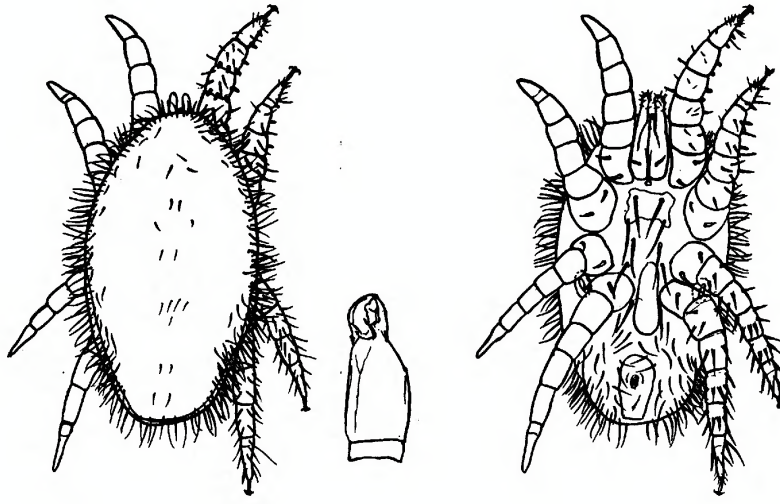

Fig. 1. Dinogamasus concinnus

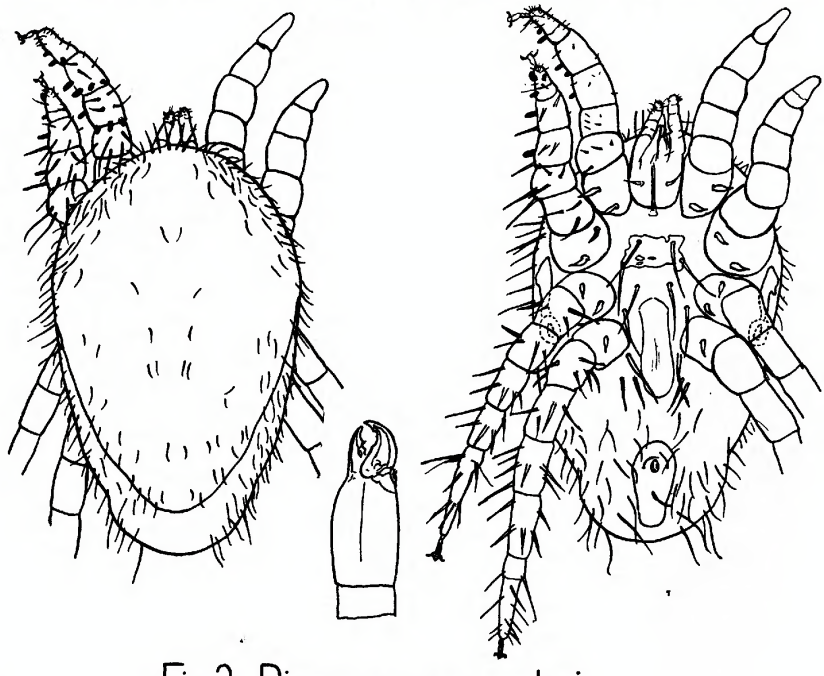

Fig. 2. Dinogamasus ramaleyi

Dinogamasus concinnus, new species

Figure 1

FEMALE.—A member of *alfkeni* group. Length: 1400μ–1450μ. Width: 780μ. Legs: I, 900μ; II, 760–800μ; III, 900μ; IV, 1100μ.

Anterior end and posterior end of body broadly rounding yet somewhat truncated. Dorsal shield broadly rounding at end, almost covering body. Body margined with many long hairs about 180μ long, which are especially numerous on sides posterior to legs IV. Dorsal shield almost bare throughout whole central area except for some twenty hairs, 80μ to 100μ long, extending down the median line, usually two abreast.

Sternal shield with concave posterior margin, bearing the second pair of sternal hairs on the acutely angled corners. Third pair of sternal hairs 140μ apart; the metasternal hairs are 120μ apart and are not as heavy as the sternal hairs. The pair of genital hairs is about as heavy as the third sternal hairs. Genital shield is 380μ long and 140μ wide near the posterior end. Anal shield is 300μ long by 200μ wide, 120μ at posterior margin. The unpaired hair is nearer to the posterior margin than to the anal opening. A few long slender hairs, from 150μ to 200μ long, are scattered over the ventral surface back of legs IV. Fixed digit of mandible about as long as movable digit.

HABITAT.—Pouch of *Mesotrichia blüthgeni* Dusmet, from Mati Davas, Mindanao, Philippine Islands; collected by R. C. McGregor.

Dinogamasus similis, new species

FEMALE.—A member of *alfkeni* group. Length: 1460μ. Width: 800μ–900μ. Legs: I, 900μ; II, 800μ; III, 880μ; IV, 1000μ.

Similar to *D. alfkeni;* distinguishable mainly by its larger size and by the fact that the hairs on the dorsal shield are from 80μ to 100μ long, while those on *alfkeni* are about 50μ or 60μ long.

HABITAT.—Pouch of *Mesotrichia chlorina* Cockerell, from Manila, Philippine Islands; and a smaller sized race of *M. cuernosensis*, from Culasi, Panay, and from Naga, Cebu Island, Philippine Islands.

Holotype from *M. chlorina*, Manila.

Dinogamasus ramaleyi, new species

Figure 2

FEMALE.—A member of *alfkeni* group. Length: 1650μ–1800μ. Width: 920μ–1000μ. Approximate length of legs: I, 1000μ; II, 880μ; III, 1250μ; IV, 1480μ.

Greatest breadth of body between legs II and III; dorsal shield from vicinity of stigmal plates leaves a margin of soft skin around posterior end of body. The central area of shield is bare except for six pairs of rather symmetrically placed hairs about 80μ long; the border of the shield near legs I and II is covered with hairs from 100μ to 160μ long; the few hairs on the posterior part of the shield and soft skin are about 80μ long while three or four at the posterior end are 200μ long.

Sternal shield thinly chitinized, irregularly eroded, usually bearing two pairs of sternal hairs, though the second pair may sometimes be on isolated pieces of the shield. Third pair of sternal hairs is as widespread as the first pair. The genital

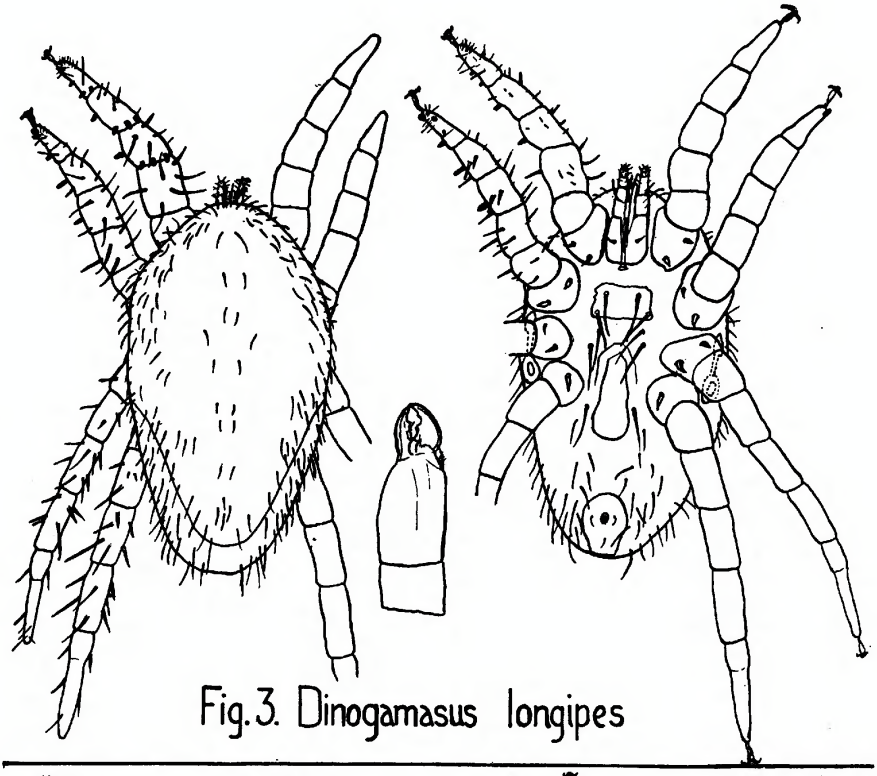

Fig. 3. Dinogamasus longipes

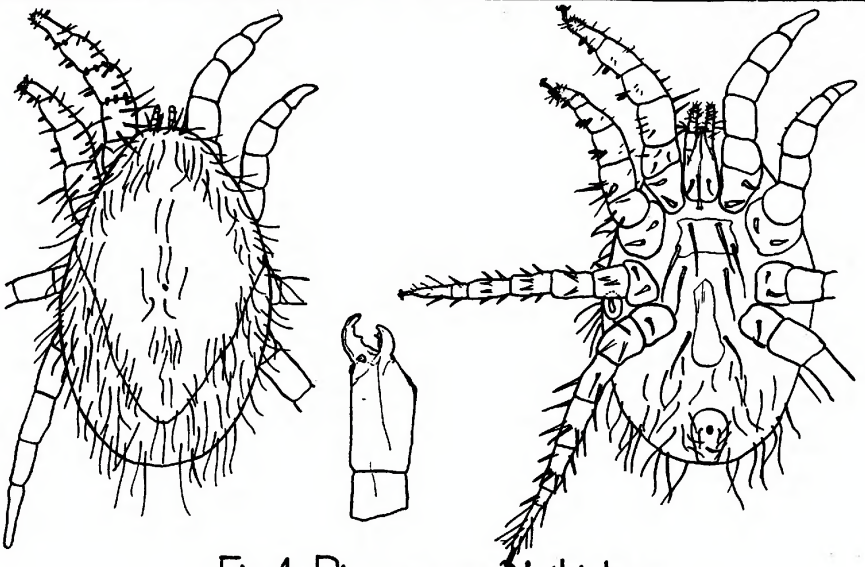

Fig. 4. Dinogamasus trihirtus

hairs are close to the posterior-inner margin of coxæ IV, flanking the genital shield, which is 400μ long by 130μ wide, the sides almost parallel, the posterior margin smoothly rounding. Two pairs of long hairs not as heavy as the genital pair flank the end of the shield.

Anal shield is 380μ long by 180μ at the greatest width. About thirty soft hairs are scattered over the soft skin surrounding the shield. The stigmal plate measures 130μ by 110μ; the peritrematalium, about 220μ long, is irregularly hatchet-shaped.

Legs have characteristic features of members of *alfkeni* group. The coxal spines are enlarged and sharply pointed. The ventral side of leg I bears only weak rudimentary hairs, the dorsal side has the usual longer hairs and four blunt cones on patella and tibia, and three blunt cones on tarsus. Leg II has long soft hairs on the dorsal side; patella II and tibia II have each a sharp spine basal-outward, a blunt cone outward-midway and two sharp spines ventral; tarsus II has a blunt cone outward on basitarsus, a short blunt cone ventral nearer apex and an enlarged claw-like cone outward at the apex.

HABITAT.—Pouch of *Mesotrichia bombiformis* (Smith), from Manila and Casiguran, Tayabas, Philippine Islands; *M. philippinensis* (Smith), from Manila; also larger race of *M. cuernosensis* Cockerell, from Culasi, Panay, and from Uling, Cebu, Philippine Islands; all collected by R. C. McGregor.

Holotype from *M. bombiformis*, Manila. Length: 1700μ. Width: 980μ.

Dinogamasus longipes, new species

Figure 3

FEMALE.—A member of *alfkeni* group. Length: 1580μ. Width: 880μ. Legs: I, 1000μ; II, 1020μ; III, 1300μ; IV, 1520μ.

Dorsal shield leaves a narrow margin of soft skin from legs II to end of body. Hairs, 100μ to 120μ long, are scattered in a more or less symmetrical arrangement through the median line of the shield; approximately four rows border the shield and soft skin of the body. Among these hairs on the margin and at the posterior end are some hairs 200μ long.

Sternal shield, wider than long, bears the first two pairs of sternal hairs. The third pair of sternal hairs is almost as far apart as the metasternal hairs.

Genital shield is 160μ at posterior end by 380μ long.

Stigmal plate is 120μ by 80μ. The peritrematalium extends forward 220μ.

Anal shield is 260μ by 190μ. The unpaired hair is midway between the anal opening and the posterior end of the shield. The few hairs scattered on the soft skin around the anal shield are about 100μ or 120μ long.

The legs possess the characteristic features of the *alfkeni* group: one midway-outer and three basal blunt cones on patella I and tibia I; one midway-outer and two basal blunt cones on tarsus I; one midway-outer blunt cone on patella II and tibia II; one outer on basitarsus, one rather distal-ventral, and one heavy subapical blunt cone outward on tarsus II.

Mandibles: fixed digit almost as long as movable one.

HABITAT.—Pouch of *Mesotrichia viridissima* (*M. confusa viridissima* Cockerell) from Trong, Siam. (Science, LXXI, pp. 607–608, June 13, 1930.)

Dinogamasus trihirtus, new species

Figure 4

FEMALE.—A member of *alfkeni* group. Length: 1400μ. Width: 820μ. Legs: I, 1000μ; II, 800μ; III, 1100μ; IV, 1240μ.

The body is widest in the region of the stigmal plates; the vertex of the body is more or less truncate; the posterior part smoothly rounding. The dorsal shield leaves a rather wide margin at the posterior part of the body from the region between legs II and III. Four or five rows of soft hairs about 200μ long border the entire body; a few hairs at the posterior end are 300μ long. In the central bare area of the anterior half of the body are four pairs of symmetrically placed long soft hairs; the posterior third of the shield has several long soft hairs merging into the longer marginal hairs.

The sternal shield, thinly chitinized, bears the first two pairs of sternal hairs; the anterior hairs are 120μ apart, the third pair of hairs 150μ apart. The metasternal pair is absent, the species thereby differing from most others of the *alfkeni* group.

The genital shield is 400μ long by 140μ wide at the widest part near the rounding posterior end. The pair of genital hairs flanks the posterior third of the shield. A few hairs about 120μ long are on the soft skin near the anal shield. Anal shield is 230μ long by 150μ at the greatest width (90μ wide at posterior end). The anal hairs are about 140μ long; the unpaired anal hair is midway between the anal opening and the posterior end of the shield.

Stigmal plate is 100μ by 120μ; there is a faint suggestion of the peritrematalium commonly present in this group.

Legs I and II have the usual features of the *alfkeni* group.

HABITAT.—Pouch of *Mesotrichia trifasciata* Gribodo, from Mati, Davao, Mindanao, Philippine Islands; collected by R. C. McGregor, 1927.

Dinogamasus macgregori, new species

Figure 5

FEMALE.—A member of *alfkeni* group. Length: 1500μ. Width: 820μ. Legs: I, 920μ; II, 850μ; III, 980μ; IV, 1200μ.

Dorsal shield tapers to a rounding point near posterior end of body, leaving a margin of soft skin posterior to legs II. Soft hairs, from 80μ to 100μ long, border the anterior fourth of the margin of the body and are scattered over the soft margin of the body and on the lateral margin of the posterior two-thirds of the shield; there are six or eight hairs ranging from 160μ to 200μ long at the posterior extremity of the body; through the median line of the dorsal shield there is a sparse sprinkling of short hairs rather symmetrically placed.

Sternal shield wider than long, 240μ by 160μ, bears the first two pairs of sternal hairs. The space between the first pair of sternal hairs is 140μ; between the second, 180μ; between the third, 120μ. The metasternal hairs are lacking as in *D. trihirtus*. Genital shield 360μ long by 120μ wide. Genital hairs as heavy as the sternal pairs.

Anal shield is 240μ long by 200μ wide, the base measuring 120μ. The few hairs surrounding the shield vary in length, some being about 60μ long, while three or four pairs which flank the shield are 200μ long. The lateral margin of the posterior part of the body has only a few short hairs.

Stigmal plate is 120μ by 190μ. Peritrematalium margining the outer side of stigmal plate extends forward 240μ, forming a sort of double-axe or irregular hatchet-shaped shield.

Mandible rather typical of the group except that teeth are not very prominent.

Coxal spines slightly inflated; those posterior on coxæ I, II, and III are the larger ones. Legs have the structures characteristic of the *alfkeni* group.

HABITAT.—Pouch of *Mesotrichia ghilianii* Gribodo, from Samar, Philippine Islands, collected by R. C. McGregor, 1924; also from a specimen of *M. ghilianii* from Iligan, Mindanao, Philippine Islands.

Holotype from Samar, Philippine Islands.

Although this species agrees with *D. trihirtus* in lacking the metasternal hairs, it may be distinguished from it by the shorter hairs of the body.

The Latin description of *Dinogamasus* (*Dolaea*) *jacobsoni* (Berlese), 1910, is so meager that it is practically impossible to recognize the species. The host is recorded as *Mesotrichia* (*Xylocopa*) *æstuans* (Linnæus). It is puzzling to know if the bee was determined correctly, since *æstuans* is exotic to tropical Asia. The host may have been the native *M. confusa* Pérez which *æstuans* so closely resembles, or it may have been some species closely allied to *confusa*, since the symbiont is not *D. alfkeni* (which Berlese said he had seen); *D. alfkeni* is the species found on *M. confusa*.

Mesotrichia æstuans, which is endemic to Africa, has been found in the Palearctic region of northern India. These specimens of *æstuans* from India bore characteristic African mites of the *braunsi* group.[1] Accordingly, it is possible that *æstuans* has reached the tropics through the trade routes and is found in Java. If this is the case, then the species which I found in *æstuans* from Suez, Africa, and from Chikar Kot, Northwest Province, and from Jammu, Kashmir, and which I named *D. inflatus*, must be *D. jacobsoni*. On the other hand, if the host is a tropical Asiatic form, *M. confusa* or allied to *confusa*, the species of mite doubtless belongs to the *alfkeni* group. *D. jacobsoni* could hardly be the species which Vitzthum[2] took from *M. cærulea* Fabricius, which species and its allies are so different from the other carpenter bees that it is conceded that they belong to a subgenus, if not to a separate genus, *Cyaneoderes* Ashmead. Thus, I believe that Vitzthum is mistaken in his recent assumption concerning *D. jacobsoni*.

The species of *Dinogamasus* which I took from *Mesotrichia cærulea* is especially characterized by eight blunt cones on patella I. This fact

[1] LeVeque, 1930, Science, LXXI, pp. 607–608.
[2] Vitzthum, 1930, Zoologische Jahrbücher, LIX, pp. 346–349, Figs. 40 and 41.

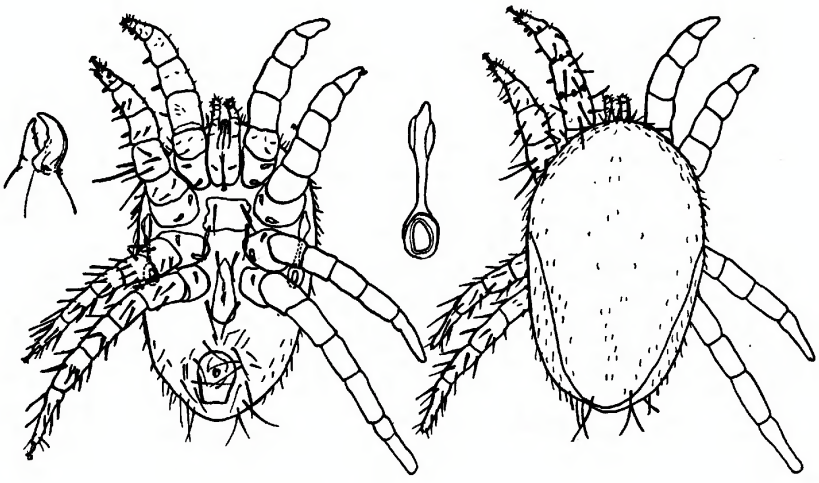

Fig.5. Dinogamasus macgregori

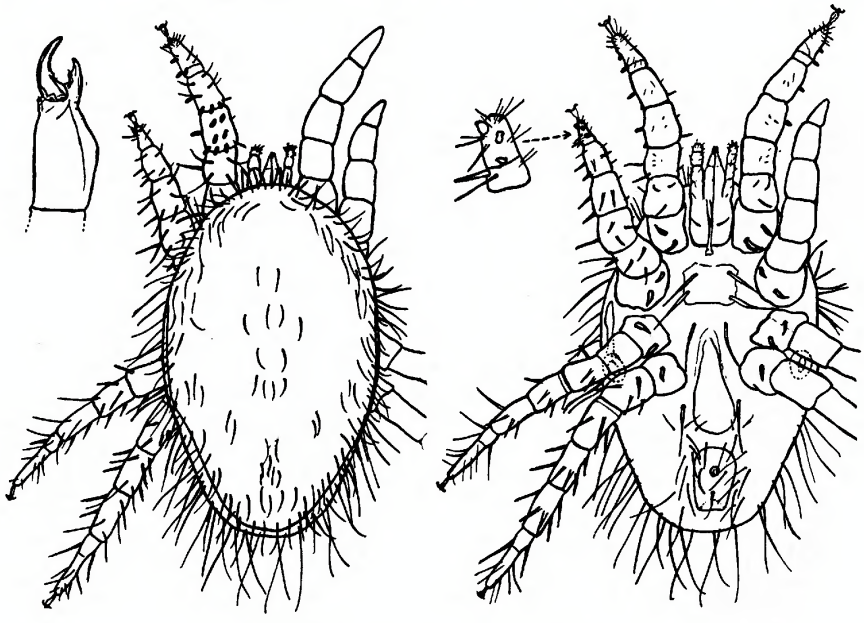

Fig.6. Dinogamasus octoconus

has suggested the new specific name *octoconus*. *D. octoconus* has also been found on *M. abbottii* Cockerell.

The *Octoconus* Group

The members of the *octoconus* group thus far examined are characterized by the following features:

Medium-sized mites; 1400μ to 1500μ long; dorsal shield with about six pairs of hairs more or less symmetrically placed along the median line, followed by a group of hairs which merge into the marginal hairs; sternal shield subrectangular, wider than long, bears two pairs of sternal hairs, the second pair near the posterior corners; anal shield somewhat wider through anal opening; peritrematalium usually poorly chitinized, thus difficult to see; fixed digit of mandible about three-fourths the length of the movable digit; leg I with eight blunt cones dorsal on patella, of which three are basal, one midway-outer, and four dorsal; tibia with three basal blunt cones and one midway-outer blunt cone; tarsus with two basal blunt cones and one midway-outer blunt cone; leg II has usually three short blunt cones on the tarsus.

Geographic Range.—Siam, Java, Singapore.

Hosts.—*Mesotrichia cærulea, M. abbottii, M. dormeyeri*, all of subgenus *Cyaneoderes* Ashmead.

Dinogamasus octoconus, new species

Figure 6

Same as *Dolaea jacobsoni* as described by Vitzthum, 1930, being from the same host, *Mesotrichia cærulea*, and corresponding with Vitzthum's figures of "*jacobsoni*." (See discussion above, wherein it is considered not to be *D. jacobsoni* Berlese, 1910.)

Female.—Length: 1500μ to 1700μ. Width: 900μ to 1000μ. Legs: I, 1100μ; II, 980μ; III, 1250μ; IV, 1450μ.

Dorsal shield covers most of the back but leaves a very narrow margin of soft skin lateral to coxæ II, III and IV, followed by a wider margin posterior to legs IV. Long, soft, finely pointed hairs are found around the margin of the body on the shield and on the soft skin; many of these marginal hairs are 300μ long. The large central bare area has a pattern of a few pairs of hairs scattered somewhat symmetrically through the median area, followed by an irregularly double row of hairs at the median posterior part of the shield which merge into the marginal hairs of the shield.

Sternal shield 200μ wide by 140μ long; slightly emarginate; bears two of the three pairs of long, heavy sternal hairs. Metasternal hairs lacking.

Genital shield broadly rounding posteriorly, 480μ long, 180μ at greatest width near posterior end, anterior margin often indistinct. The pair of genital hairs is almost as heavy as the sternal hairs.

Anal shield measures 300μ by almost 200μ. Unpaired anal hair usually midway between anal opening and posterior margin of shield. About twenty-four soft hairs approximately 180μ long are near the anal shield; the lateral surface of skin posterior to coxæ IV is bare. Hairs of margin of body are long, some being 350μ long.

Stigmal plate broadly oval, 140μ long by 120μ wide. Peritrematalium, indistinct on many specimens, extends forward 260μ, being 50μ wide at distal spread.

Leg I: ventral, three or four very fine, short, rudimentary hairs on each segment; dorsal, six heavy, soft, long hairs on femur, eight blunt cones on patella, besides one

short stiff spine on inner basal margin, and one shorter, very fine hair midway on inner side of patella; on tibia, four blunt cones, three of which are basal, the other one midway on outer side, also four moderately long hairs on dorsal side, two fine rudimentary hairs on inner side; on tarsus, two basal blunt cones, one of which is more dorsal, the other being outwardly directed, and another blunt cone midway on outer side, besides several fine hairs, some short, others longer, on apical half of segment.

Leg II: three short hairs ventral on trochanter, also a spine on each side; femur has three slightly stronger hairs ventral, one long spine-like structure midway on outer side, two very fine short hairs on inner side, and three or four long hairs dorsal; on patella and tibia, three spine-like hairs midway, the outer one of which is longest, also one shorter, spine-like hair basal on outer side, five hairs dorsal on patella, four dorsal on tibia; tarsus not as long as tibia; basitarsus bears on outer side a spine which is occasionally modified as a blunt cone, also a slender spine median-ventral and close to basitarsus, a heavier blunt cone midway to the apex, and a thicker blunt cone outward-subapical; there are also several long fine hairs on the tarsus.

Legs III and IV: the usual spine-like hairs on all segments, with a few long softer hairs on outer and dorsal side of tibia and tarsus.

HABITAT.—Pouch of *Mesotrichia cærulea* (Fabricius) from Depok and Mt. Salak, Java, collected by Bryant and Palmer, 1909, and from Buitenzorg, Java; also from pouch of *M. abbottii* Cockerell from Trong, Siam, collected by Dr. W. L. Abbott.

Holotype from *M. cærulea* from Mt. Salak, Java.

Dinogamasus bakeri, new species

Figure 7

FEMALE.—A member of *octoconus* group. Length: 1460μ. Width: 860μ. Legs: I, 960μ; II, 840μ; III, 1100μ; IV, 1300μ.

Very similar to *D. octoconus*, especially in respect to arrangement and occurrence of hairs of margin and dorsal shield, and to number and occurrence of blunt cones, hairs and spines on legs, also in absence of metasternal hairs. Differs mainly in smaller size of body, length of legs, and in the following details: genital hairs are weak in comparison to sternal hairs, being only little larger than the ventral hairs around the anal shield; the ventral hairs are more numerous than on *octoconus*, there being forty or more around the shield; the longest hairs of the lateral margins are only about 160μ, those of the posterior margin about 200μ, while those of *octoconus* are longer, ranging from 200μ to 350μ. The sternal shield is very faintly chitinized. Anal shield: 260μ long by 160μ wide.

HABITAT.—Pouch of *Mesotrichia dormeyeri* Enderlein, from Singapore; collected by C. F. Baker.

Dinogamasus brevipes, new species

Figure 8

FEMALE.—Very similar to members of the *octoconus* group but differs from them mainly by having very short hairs on dorsal shield and around posterior margin of body, by having metasternal hairs present, and by having two blunt cones on tibia II as well as some spines on that segment. Legs III and IV are relatively short. Length: 1400μ. Width: 800μ. Legs: I, 800μ; II, 780μ; III, 880μ, IV, 940μ.

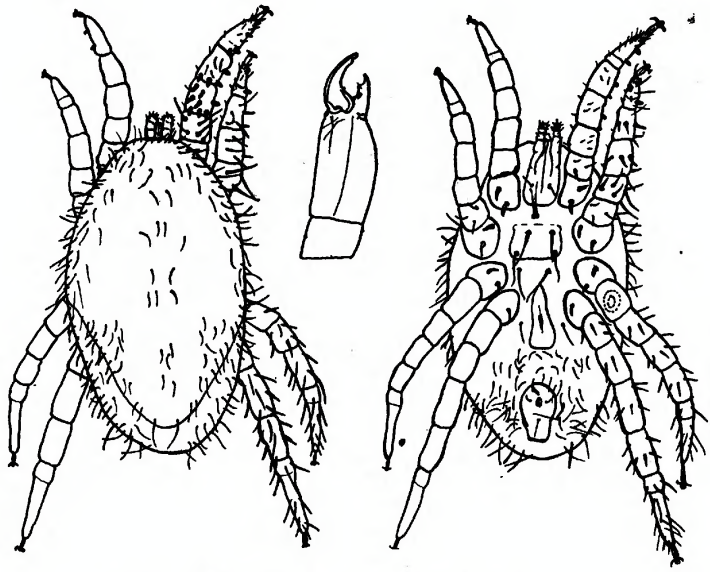

Fig. 7. Dinogamasus bakeri

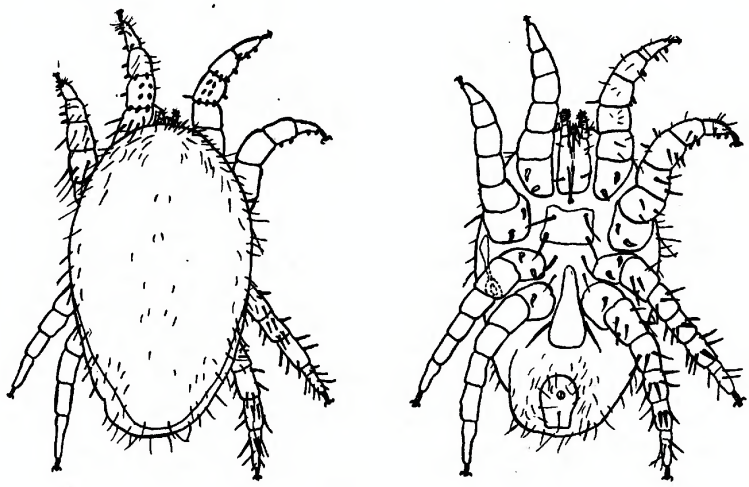

Fig. 8. Dinogamasus brevipes

Dorsal shield almost covers back; three or four rows of relatively long hairs around anterior fourth of shield, otherwise very few hairs on the margin of the shield or on the posterior margin of soft skin, though some of these are as long as 150μ; most of the few hairs of the posterior part of the dorsal shield are only 60μ long; there are eight or ten short, stiff hairs on the bare central area of the shield.

Sternal shield, 220μ wide by 190μ long, bears two pairs of sternal hairs, the second being very close to the margin of the shield. Third pair of sternal hairs 100μ apart; metasternal pair 150μ apart. Genital shield 370μ long by 160μ at greatest width near posterior rounding end. Anal shield, 300μ long by 180μ wide, surrounded by approximately twenty-four soft hairs.

Stigmal plate is 160μ by 110μ; peritrematalium extends forward 220μ.

Coxal spines large and inflated, except the one on coxa IV, which is quite slender.

Leg I: similar to that of *D. octoconus* with all ventral hairs weak and rudimentary; dorsal side of femur with customary long heavy hairs; patella with eight heavy blunt cones; tibia with three basal and one midway-outer blunt cone and fine rudimentary hairs at tip.

Leg II: trochanter bears three soft hairs ventrally; femur bears a short, heavy spine midway-ventral, two finer hairs outward-ventral, and four long hairs dorsal; patella has three sharp spines in a cross-row midway on outer side, four dorsal moderately long hairs, one basal-inner spine; tibia has one basal-outer and one midway-outer blunt cone, two midway-ventral spines which with the midway-outer blunt cone makes three structures in a cross-row, also four fine dorsal hairs; tarsus very short (basitarsus is about as long as distal segment of tarsus) has a blunt cone near junction of basitarsus about midway on tarsal segments, a short inflated finely pointed hair midway ventral near basitarsus, a short blunt cone ventral and another heavier one outward near apex of segment, and has the usual fine hairs at the tip of the segment, some of which are almost as long as the segment.

Legs III and IV: relatively shorter than those of most species of *Dinogamasus*.

HABITAT.—Pouch of *M. sinensis* (Smith), from Shin Kai Si, Mt. Omei, Szechwan, China; collected by D. C. Graham, 1923 (U. S. National Museum).

This species is very similar to *D. octoconus* and *D. bakeri* by having eight cones on patella I, but differs particularly in having the metasternal hairs present and by having two blunt cones on tibia II. The host does not belong to subgenus *Cyaneoderes*; thus the presence of the eight cones on this mite may be more a point of convergent resemblance than of natural relationship to members of the *octoconus* group.